Message

From: LEE, LILY [LEE.LILY@EPA.GOV]
Sent: 10/12/2018 8:55:49 PM
To: Walker, Stuart [Walker.Stuart@epa.gov]
Subject: BPRG calculator

1. Section 6.2.2, Changes in Toxicity and Other Contaminant Characteristics: EPA Guidance calls for evaluation of the significance of changes in toxicity values and other contaminant characteristics when conducting a Five-Year Review.[1] The EPA's Preliminary Remediation Goal (PRG) Calculators for soil, the Building PRG Calculator for buildings, and the Surface PRG Calculator for surfaces, "which are used to develop risk-based PRGs for radionuclides, are recommended by EPA for Superfund remedial radiation risk assessments."[2] Here is a link to lists, by date, of the changes in these calculators over the past 5 years: https://epa-prgs.ornl.gov/radionuclides/whatsnew.html. EPA has previously commented that this fourth FYR should include updated risk evaluations for existing remediation goals (RGs) using the current versions of the EPA's PRG Calculators, but this is not addressed in the FYR. For example, risk should be calculated for soil, buildings, piers, and bollards. Please revise the FYR to include the results of updated risk evaluations for existing RGs using the current versions of the EPA's PRG calculators to ensure that existing RGs remain protective. In performing the new evaluation please also keep in mind the following:

    a. Excerpts from EPA Guidance:
        i. "cleanup levels not based on an ARAR should be based on the carcinogenic risk range (generally 10^-4 to 10^-6, with 10^-6 as the point of departure and 1 x 10^-6 used for PRGs." [3]
        ii. "Consistent with existing Agency guidance for the CERCLA remedial program, . . . EPA generally uses 1 x 10^-4 in making risk management decisions."[4]

    b. For EPA to sign a Finding of Suitability to Transfer (FOST) for any parcel, the record must also show that the remedy is consistent with the NCP. Please note that if this review shows that the estimate risk is close to 1 X 10^-4, EPA recommends not setting a Remedial Goal too close to this upper bound 10^-4. First, this increases the potential for the combined risk from multiple contaminants of concern found at a single location to exceed the National Contingency Plan (NCP) risk range of 10^-6 to 10^-4. Adding risks from multiple radionuclides of concern found at the same location, even if individual radionuclide concentrations do not exceed the individual thresholds of concern, is consistent with the Unity Rule in the MultiAgency Radiation Survey and Site Investigation Manual (MARSSIM).[5] Second, in general, EPA estimates of risk at a given

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[1] Appendix G, in particular the flowchart Exhibit G-4, "Evaluating Changes in Toxicity and Other Contaminant Characteristics," which shows the process you should use to evaluate the significance of changes in toxicity values and other contaminant characteristics when conducting a five-year review. Appendix G, Exhibit G-5, "Hypothetical Scenario for a Change in Toxicity," and Exhibit G-6, "Decision Process for a Hypothetical Change in Toxicity," provide an example of the evaluation process when there are changes in toxicity and other characteristics. *Comprehensive Five Year Review Guidance*, OSWER No. 9355.7-038-P, June, 2001, https://semspub.epa.gov/work/HQ/128607.pdf

[2] "Radiation Risk Assessment at CERCLA Sites," OSWER Directive 9200.4-40, EPA 540-R-012-13, June 2014, Q1, p. 17.

[3] Id., Q33, p. 27, and OSWER Directive 9200.4-18 (U.S. EPA 1997a).

[4] Id., Q34, p. 27.

[5] "**unity rule (mixture rule):** A rule applied when more than one radionuclide is present at a concentration that is distinguishable from background and where a single concentration comparison does not apply. In this case, the mixture of radionuclides is compared against default concentrations by applying the unity rule. This is accomplished by determining: 1) the ratio between the concentration

radionuclide concentration have increased over time. It would be prudent to allow room to accommodate these likely future increases.

c. Buildings PRG Calculator Users Guide:[6]

i. Hard Surfaces Only - The risk assessment model for dust includes the receptor spending time on hard and soft surfaces. During a September 5, 2018, conference call, the Navy suggested that EPA consider only hard surfaces during the calculation of risk. For the calculation, the Navy suggested that EPA add the time that the receptor would have spent on soft surfaces to the time the receptor spends on hard surfaces. This would give a total time of 16 hours on hard surfaces for child and 16 hours on hard surfaces for adult. Upon researching the current state of the buildings as well as the condition of the areas where radioactive material was used and stored, EPA agreed that only hard surfaces should be considered. In addition, the transfer factor of hard surface (i.e. 0.5) is much greater than the soft surface (i.e. 0.1). This suggests that a receptor is more likely to transfer contamination onto his/her skin from hard surface than a soft surface such as carpet. If the assumption is that all areas within the building is a hard surface and more time is spent on hard surfaces, the risk will increase, creating a more conservative model.

ii. Changing K to 0.38: The BPRG allows the user to add a dissipation rate to the model. The dissipation rate is described in the User's Guide as follows: "In some circumstances, the load of dust on a contaminated surface, to which receptors are exposed, may decline over time. Dissipation of dust may result from cleaning, and transfer to skin and clothing. Different surfaces may be cleaned at different rates and any dissipation rate used should consider a representative cleaning frequency." Currently, the dissipation rate default for the BPRG calculator is set to 0 yr^{-1}. This assumes that a contaminant reservoir is present. By assuming a non-zero for the dissipation rate, the model suggests that various consistent mechanisms will occur to dissipate the contaminant year after year. Mechanisms for example could include a combination of cleaning, resuspension and dilution with uncontaminated dust. Not having a dissipation factor also ensures that if by chance contamination does get back into the home that recontamination is accounted within the model. The User's Guide also warns users about adding a dissipation rate: "WARNING: Using a dissipation rate constant or changing the value of t should only be done once a complete understanding of the mathematics involved in deriving the equation is gained and the site conditions have been fully investigated." The Navy's dissipation rate suggested was 0.38 yr^{-1} , which comes from a study of the Binghamton State Office Building contaminated with dioxin. If a non-zero dissipation factor is applied to the model, the dissipation rate must be calculated using data from the Hunters Point Naval Shipyard (HPNS). Outside data and studies cannot be applied to HPNS.

iii. Reducing transfer factors: The fraction transferred from surface to skin used in the BPRG default are 0.5 for hard surfaces and 0.1 for soft surfaces. Since only hard surfaces are being considered, the Navy suggested that the transfer factor for hard surfaces of 0.5 be

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of each radionuclide in the mixture, and 2) the concentration for that radionuclide in an appropriate listing of default values. The sum of the ratios for all radionuclides in the mixture should not exceed 1." Source: http://www.marssim.com/MARSSIM_Definitions.htm

[6] https://epa-bprg.ornl.gov/bprg_users_guide.html

reduced to 0.2 since "20% removable" is what has been assumed at Hunters Point, and is a national standard as published by EPA ORIA. With extensive research conducted for hard surfaces at the World Trade Center, EPA cannot deviate from the default of 0.5 for hard surfaces. If further studies and/or tests have been conducted at HPNS regarding the percent of removable contamination, EPA may adopt those fractions.

d. Radon gas in a building can accumulate without implementation of radon reduction approaches. EPA's Office of Air and Radiation wrote, "Some natural ventilation occurs in all homes. . . . However, once windows, doors and vents are closed, radon concentrations most often return to previous values within about 12 hours. Natural ventilation in any type of home should normally be regarded as only a temporary radon reduction approach because of the following disadvantages: loss of conditioned air and related discomfort; greatly increased costs of conditioning additional outside air; and security concerns."[7]

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[7] 2016 Consumers Guide to Radon Reduction, EPA 402/K-10/005, 2016, https://www.epa.gov/sites/production/files/2016-12/documents/2016_consumers_guide_to_radon_reduction.pdf